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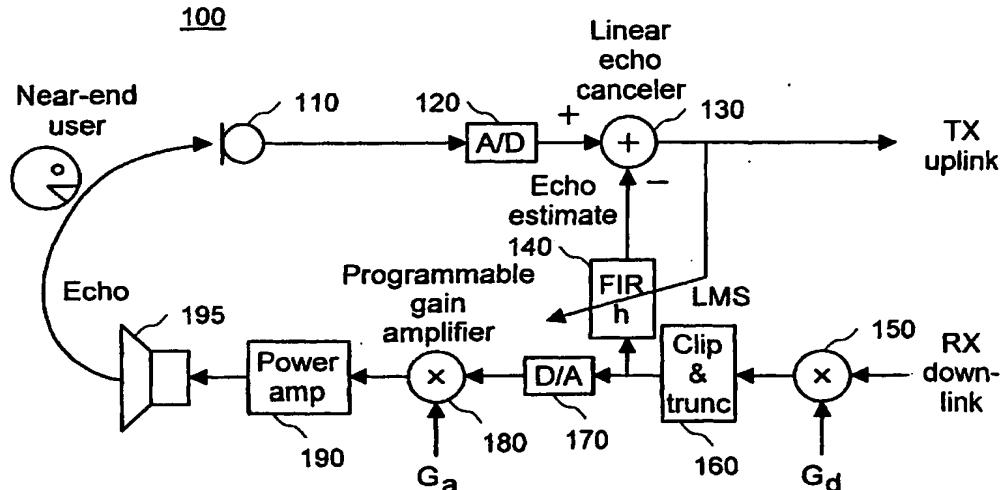
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(54) Title: VOLUME CONTROL FOR A COMMUNICATIONS DEVICE INCLUDING AN ECHO CANCELLER



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(57) Abstract: In handsfree communications devices including a linear echo or noise canceler, both analog and digital gain factors are adjusted in response to user volume control inputs, the analog gain factor being frozen during active communications (e.g., during telephone calls). By providing dual user controls, one of which is disabled when a call is in progress, embodiments of the invention provide the wide dynamic range required in most handsfree applications without degrading performance of the linear echo canceler.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04M9/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, A	EP 0 999 689 A (SAMSUNG ELECTRONICS CO LTD) 10 May 2000 (2000-05-10) page 1, line 27 - line 48 ---	1-18
A	EP 0 515 242 A (TELECOMMUNICATIONS SA) 25 November 1992 (1992-11-25) abstract; figure 2 ---	1-18
A	KUO S M ET AL: "ACOUSTIC NOISE AND ECHO CANCELLATION MICROPHONE SYSTEM FOR VIDEOCONFERENCING" IEEE TRANSACTIONS ON CONSUMER ELECTRONICS, US, IEEE INC. NEW YORK, vol. 41, no. 4, 1 November 1995 (1995-11-01), pages 1150-1158, XP000553493 ISSN: 0098-3063 abstract ---	1-18

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>MAKINO S ; KANEDA Y: "Acoustic echo canceller algorithm based on the variation characteristics of a room impulse response " ICASSP 90. 1990 INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH AND SIGNAL PROCESSING (CAT. NO.90CH2847-2), vol. 2, 3 - 6 April 1990, pages 1133 -1136, XP002157125 ALBUQUERQUE, NM, USA abstract</p> <p>-----</p> <p>BERSHAD N J ET AL: "Saturation effects in LMS adaptive echo cancellation for binary data" IEEE TRANSACTIONS ON ACOUSTICS, SPEECH AND SIGNAL PROCESSING, US, IEEE INC. NEW YORK, vol. 38, no. 10, 10 October 1990 (1990-10-10), pages 1687-1696, XP002122020 the whole document</p> <p>-----</p>	1-18
A		1-18

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
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